

**SEMICONDUCTOR DEVICE AND METHOD FOR MAKING THE DEVICE
HAVING AN ELECTRICALLY MODULATED CONDUCTION CHANNEL**

ABSTRACT OF THE INVENTION

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A semiconductor device having a conduction channel which is electrically modulated. A trench structure is formed within a substrate enclosing a diffusion region. The trench structure isolates the devices formed within the diffusion region from the remaining portion of the substrate. The trench walls are made thin enough so that the width of the channel within a diffusion region may be controlled by applying an electrical potential between a trench wall and the substrate. Transistors formed within the trench structure have a conduction channel width controlled by the applied voltage permitting the gain of the transistor to be matched with the gain of other transistors on the substrate.